resulting longitudes. The difference of longitude Vladivostok-Manila remains uncorrected for plus the difference of personal equation of two of the observers, and the difference of longitude Manila-Madras remains uncorrected for plus twice the difference of personal equation of the same two observers. The two results for the longitude of Manila are as follows:

1.

	h m s	s
Manila Cathedral Dome-Madras, U. S. Navy,	2 42 53.000	±0.057 + 2 (*N*.-*G*.)
Madras-Greenwich, English and Germans,	5 20 59.238	±0.022
Manila Cathedral Dome-Greenwich,	8 03 52.238	±0.061 + 2 (*N*.-*G*.)

2.

	h m s	s
Vladivostok-Manila Cathedral Dome, U. S. Navy,	0 43 38.500	±0.059 + (*N*.-*G*.)
Vladivostok-Greenwich, Russians and Germans,	8 47 31.197	±0.146
Manila Cathedral Dome-Greenwich,	8 03 52 697	±0.157 − (*N*.-*G*.)

The symbol (*N*.-*G*.) indicates the unknown personal equation correction to these determinations of the longitude of Manila. Owing to this unknown correction, it is difficult to give proper weights to these two values of the longitude of Manila to combine them with the value recently determined by the Coast and Geodetic Survey *viâ* United States. It is probable that the value of (*N*.-*G*.) is plus and the corrections, if known, would bring the two longitudes of Manila closer together. Taking the mean of the two values, we have:

	h m s
Manila Cathedral Dome-Greenwich	8 03 52.468 + ½ (*N*.-*G*.).

which differs only 0ˢ.042 or 61.7 feet from the Coast and Geodetic Survey result.

In 1881–2 the U. S. Navy adopted for the longitude of Madras 5ʰ 20ᵐ 52ˢ.42, which gave for their value of the longitude of Manila 8ʰ 03ᵐ 52ˢ.42. This value, which differs only 0ˢ.006 or 8.8 feet from the Coast and Geodetic Survey result, has been used since 1882.

The difference of longitude San Francisco-Manila determined by the Coast and Geodetic Survey has a probable error of ± 0.022. The longitude of San Francisco depends upon the longitude net of the United States and its connection with that of Europe, and includes seventy-two differences of longitude between forty-five points. Four of these differences of longitude are trans-Atlantic, three by the Coast and Geodetic Survey and one (1892, not yet published) by the English and Canadians. In view of these facts and the unknown correction for personal equation in the other two values of the longitude of Manila, the value determined by the Coast and Geodetic Survey will be accepted.

EDWIN SMITH.
COAST AND GEODETIC SURVEY,
September 2, 1904.

BOTANICAL NOTES.

SYSTEMATIC NOTES.

Two new blackberries (*Rubus vermontensis*, and var. *viridifolius*), allied to *Rubus argutus*, are described by W. H. Blanchard in the July number of the *American Botanist*. They occur in southern Vermont.—The July number of the *Fern Bulletin* contains an annotated list of the ferns of Kentucky by the late Miss S. F. Price. Thirty-eight species of ferns and four lycopods are included.—Professor E. L. Greene continues the publication of his 'Leaflets,' the last fascicle (pages 49–64) bearing date of August 25, 1904, and including systematic discussions pertaining to *Cactaceae, Gentianaceae, Apocynaceae, Cichoriaceae* and *Rhamnaceae*.—In the August number of *Torreya* Dr. N. L. Britton describes a new alder (*Alnus noveboracensis*) from Staten Island.—Mr. C. G. Lloyd's 'Mycological Notes' for June include some interesting paragraphs in regard to the herbaria of Kew, the British Museum, Linnaean Herbarium, Leiden and Berlin, as well as personal notes about some of the botanists now or formerly associated with these collections.—Mr. E. P. Bicknell continues his studies of *Sisyrinchium* in the June *Torrey Bulletin*, describing five new species from California. In the same journal Dr. P. A. Rydberg describes twenty-five new species and varieties of flowering plants from the Rocky Mountain region.—W. A. Murrill continues his series of papers on the *Polyporaceae* of North America in the August *Torrey Bulletin*, and separates the following new genera from *Polyporus*, viz., *Abortiporus, Cyclomy-*

cetella, Cycloporus, Globifomes, Nigrofomes and *Poronidulus*.

STUDIES OF SEXUALITY IN BLACK MOLDS.

EVERY student of botany in the last quarter of a century has given some attention to the black molds (*Mucoraceae*), some species of which are so common as to be obtainable for laboratory use at any season of the year. Yet while every one has been able to study the gross anatomy of black molds, and the formation of their interesting conidia, their zygospores, which are still more interesting, are so difficult to obtain they have rarely been available for study. Whether we regard the sexual organs of black molds as primitively isogamic, or as essentially heterogamic with a degradational approach to isogamy, they are interesting objects of study in the laboratory. Anything which will make it easier to secure these structures is to be regarded as of much importance scientifically and practically. This service has been rendered by Mr. Albert F. Blakeslee in a recent paper published by him in the *Proceedings of the American Academy of Arts and Sciences* (Vol. XL., No. 4, August, 1904), under the title of 'Sexual Reproduction in the Mucorineae.' A preliminary summary of the results of this paper was published in SCIENCE, June 3, 1904, and we now have the full account. The present paper contains about 120 pages of text, and is accompanied by four plates aggregating fifty-eight figures. Here are given the details of many experiments undertaken by the author in order to determine the cause or causes of zygospore formation. The ingenuity of some of these experiments must command the admiration of every one who reads the paper. It will be remembered that the most striking result of Mr. Blakeslee's experiments has been the discovery that zygospores of the black molds may be obtained by growing different strains side by side, the zygospores appearing where the hyphae of the two strains intermingle. The practical importance of this discovery will be appreciated by all who have laboratories in which students are at work. The author promises to continue his studies, and reserves an extended discussion of certain problems 'until he has accumulated a greater body of facts on the subject.'

EGG FORMATION IN GREEN FELT (VAUCHERIA).

DR. BRADLEY M. DAVIS has made a careful study of egg-formation (oogenesis) in a species of green felt (*Vaucheria*), one of the common fresh-water algae, and published his results in the August number of the *Botanical Gazette*. These plants have great numbers of minute nuclei which are not separated by walls, and when the lateral protrusion forms in which an egg is finally to develop, it also contains a large number of nuclei. This protrusion (oogone) is soon separated from the rest of the filament by a cross-wall which forms when it is about two thirds its full size. About this time there sets in a degeneration of nuclei resulting in the disappearance of all but one, so that the oogone is eventually uninucleate. The single nucleus increases rapidly in size until 'in the mature egg it is three or four times as large as the original nuclei in young oogonia.'

The author calls attention to the essential agreement of the process of egg formation in *Vaucheria* with those of certain phycomycetetous fungi (*Saprolegnia, Phythium, Peronospora, Plasmopara, Sclerospora, Albugo* and *Araiospora*). He discusses the relationship of *Vaucheria* to other green algae, suggesting its derivation from ancestors whose oogonia were multinucleate. The relationship of the water molds (*Saprolegniales*) and downy mildews (*Peronosporales*) presents some difficulties, but the author calls attention to the fact that they possess many points of similarity to *Vaucheria*. Their relationship to the molds (*Mucorales*) is more obscure, but here again similarities are not wanting. The paper is very suggestive, and will repay careful perusal.

RECENT FORESTRY BULLETINS.

THREE bulletins (numbers 47, 48, 49) of much more than ordinary interest have been issued recently by the United States Bureau of Forestry. In the first Professor Bray, of the University of Texas, discusses the 'Forest Resources of Texas.' He calls attention to

the vast area included within the boundaries of Texas, and the great diversity in all the factors (latitude, elevation, soil, rainfall, temperature, sunlight, winds, etc.) which have to do with forest distribution. For example, the rainfall in the eastern part of the state is over fifty inches, diminishing regularly to about ten inches in the extreme west. So too the surface rises from sea-level along the gulf to the high plains 4,000 to 5,000 feet higher, and to mountains which reach an altitude of nearly 10,000 feet. On this diversified surface the forests have been distributed in a most varied pattern. The 'shortleaf pine' occupies a large area two to three counties wide in the northeast, the 'long-leaf pine' a similar area in the southeast, while west of the latter is an area of 'loblolly pine.' In the region west of the Pecos River are small areas of Rocky Mountain conifers. Belts of live oak forests alternate with post oak nearly halfway across the state from southeast to northwest, at last passing into the mesquite and chapparel of central and western Texas. In addition to the forests of the general surface, there are the 'hardwood forests' (composed of oaks, ash, hickory, walnut, gum, elm, cotton wood, linden, maple, osage orange, etc.) of the alluvial bottom lands bordering the streams of the southeast half of the state. A list of sixty 'valuable timber trees' native to Texas is compiled by the author, who adds notes on their distribution, habits and uses.

A second paper by Professor Bray (Bulletin 49) is entitled 'The Timber of the Edwards Plateau of Texas,' and deals with the southernmost province of the Great Plains region where it ends abruptly at the Pecos River and the escarpment line extending easterly from its junction with the Rio Grande. The annual rainfall averages twenty-five inches, being as high as thirty-three inches on its easterly side, and sinking to fifteen inches on the west. The air humidity is usually low, the annual evaporation amounting to more than fifty inches. On this region the forests are slowly spreading, or as the author expresses it, there is 'a transition from grass to woody growth.' The trees which make up the forest areas on the plateau belong chiefly to the Atlantic type, and include elms, live oaks, post oak, walnut, pecan, sycamore, green ash, hickory, soapberry, etc. From the Rocky Mountains have come the pinon pine, two or three cedars and several oaks. The author devotes a considerable space to a discussion of the encroachment of the forests upon the open lands. "Though the encroachment of timber on the prairie is gradual and insidious, to those whose observation covers a space of twenty-five years the change is truly startling. Where at the beginning of that period the prairie held undisputed sway, the observer now finds himself shut in by miles of oak scrub on every side. Men who drove cattle in the early days say that they rode across an open country from above Georgetown to the Colorado breaks, in Williamson County. This same region is now all heavily timbered."

The third paper (Bulletin 48) is on 'The Forests of the Hawaiian Islands,' by W. L. Hall, of the bureau, who made a reconnoisance of the forests of the islands in 1903. The paper opens with the statement that there are two very distinct kinds of forests on the islands, one on the drier lowlands near the sea, and the other on the mountain slopes where there is a heavy rainfall. The first of these consist of the single introduced tree, *Prosopis juliflora*, known as 'algaroba' on the islands. It is the 'mesquite' of Texas and Mexico, and was introduced by Father Bachelot, in 1837. From the original tree, which is still standing, it is now estimated that at least 50,000 acres of forest have sprung, 'fairly well distributed over the different islands.' The native forests, which constitute the type and occur on the mountain slopes, "are distinctively of tropical character. None of the familiar trees of the north temperate zone are present. The observer looks in vain for oaks, maples, pines or spruces." Popular descriptions are given of the more important trees, lehua (*Metrosideros polymorpha*), koa (*Acacia koa*), mamane (*Sophora chrysophylla*) and kukui (*Aleurites triloba*). Attention is called to the decadence of the forests, due to the inroads of cattle, goats, insects and fire and in many places to destructive cutting. The danger of a further reduction of the forest area is

discussed and a far-sighted forest policy is recommended. The setting aside of forest reserves and the exclusion of stock is advocated, as well as the planting of certain areas. The paper is a most valuable contribution to our knowledge of the forests of these islands.

CHARLES E. BESSEY.

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*DECLARATION OF THE NATIONAL EDUCATIONAL ASSOCIATION.**

1. We can not emphasize too often the educational creed first promulgated more than a century ago that 'religion, morality and knowledge being necessary to good government and the happiness of mankind, schools and the means of education shall forever be encouraged.' This declaration of the fathers must come to us now with newer and more solemn call when we remember that in many parts of our common country the fundamental questions of elementary education—local taxation, consolidation of weak schools, rational supervision, proper recognition of the teacher as an educator in the schools system, school libraries and well trained and well paid teachers—are still largely unsettled questions.

2. We would direct attention, therefore, to the necessity for a supervisor of ability and tact for every town, city, county and state system of public schools. Not only are leaders needed in this position who can appreciate and stimulate the best professional work, but qualities of popular leadership are also demanded to the end that all classes of people may be so aroused that every future citizen of the republic may have the very best opportunities for training in social and civic efficiency.

3. The very nature of the teacher's task demands that that task be entrusted only to men and women of culture and of intellectual and moral force. Inadequate compensation for educational work drives many efficient workers from the school room and prevents many men and women of large ambition for service from entering the profession. It is creditable neither to the profession nor to the general public that teachers of our children, even though they can be secured, should be paid the paltry sum of $300 a year, which is about the average annual salary of teachers throughout the country.

4. The Bureau of Education at Washington should be preserved in its integrity, and the dignity of its position maintained and increased. It should receive at the hands of our lawmakers such recognition and such appropriations as will enable it not only to employ all expert assistance necessary, but also to publish in convenient and usable form the results of investigations; thus making that department of our government such a source of information and advice as will be most helpful to the people in conducting their campaigns of education.

5. We would emphasize the necessity for the development of public high schools wherever they can be supported properly, in order that the largest number possible of those who pass through the elementary grades may have the advantage of broader training, and for the additional reason that the public elementary schools are taught largely by those who have no training beyond that given in the high schools.

6. As long as more than half of our population is rural, the rural school and its problems should receive the solicitous care of the National Educational Association. The republic is vitally concerned in the educational development of every part of its territory. There must be no forgotten masses anywhere in our union of states and territories, nor in any one of its dependencies.

7. We believe that merit and merit alone should determine the employment and retention of teachers, that, after due probation, tenure of office should be permanent during efficiency and good behavior, and that promotions should be based on fitness, experience, professional growth and fidelity to duty. We especially commend the efforts that are being made in many parts of the country whereby teachers, school officials and the general public working together for a common purpose are securing better salaries for teachers and devising a better system for conserving the rights and privileges of all and for improving the efficiency of the schools.

* St. Louis, Mo., July 1, 1904.